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# REPORT

ON THE

Quantity, Quality and Value

OF

# THE COAL

ON THE

LANDS OF THE CARBONDALE COAL AND COKE COMPANY,

IN WILLIAMSON COUNTY, ILLINOIS,

WITH

FULL REFERENCE TO ITS COKING AND IRON  
MAKING QUALITIES, ESTIMATED COST OF  
COKING PLANT AND OTHER COM-  
PARATIVE ESTIMATES.

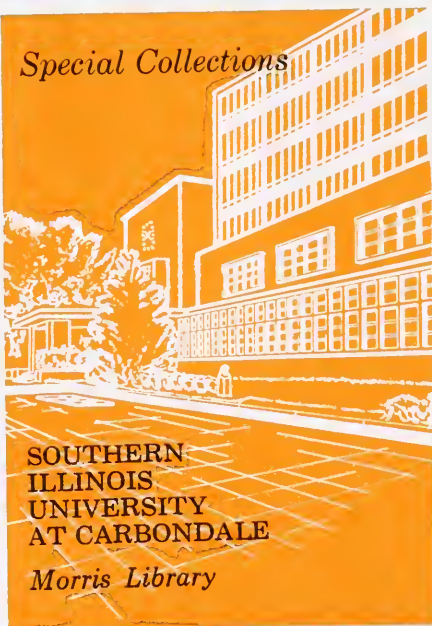
BY

JOSEPH E. WARE, M. E.

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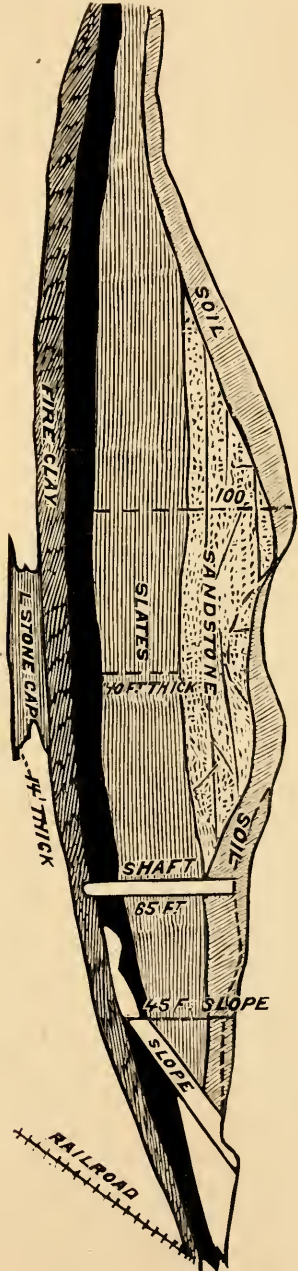
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Section of 9' Vein on land of Carbondale Coal and Coke Co., Williamson County, Ills.



7.

Over No. 7.

6.

5.

4.

3.

2.

1.



# REPORT AND ESTIMATES

—ON—

## COAL AND COKE MAKING

From Lands of the Carbondale Coal and Coke Company.

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A. C. BRYDEN, ESQ.,

*President Carbondale Coal and Coke Company:*

DEAR SIR: I have visited the coal property of the Carbondale Coal and Coke Company, located in Williamson County, Illinois. I also visited the Grand Tower Furnace, to inspect the coke ovens there, to obtain a full and clear view of the results obtained in that furnace by a run of eighteen months on Williamson county coke, as against the Connellsville, Pennsylvania, coke, that had been exclusively used until the change took place.

Mr. Thomas, an experienced Welsh coke-master, had the entire charge of the coking that was done, wherein your coal was used. Close personal observation enabled Mr. Thomas to afford me very valuable information. When in blast, the charge of fuel with the two was nearly equal parts of coke and raw Muddy River coal; the same proportional charge being kept up with the Connellsville

Coke and the Williamson County Coke. The result arising from the use of the Williamson County Coal as coke, was admitted to be everything that had been obtained from over five years use of the Pennsylvania article.

On account of low water in the Ohio River the customary supply of coke was cut off to the Grand Tower Furnace. Muddy River coal would not coke; the alternative was either to suspend work, or find a local substitute. After trying your coal for a coke supply, the coal from your nine-foot vein was found to be a good coking coal, the product being firm, pure, and fully up to the iron making properties of the Connelville article. The yield of metal was alleged to be even greater with the Williamson County Coke than prior to its use. The character of Grand Tower Iron has not been excelled by any iron made in our own city. Their mill iron was not excelled as a nail plate iron, the Belleville nails therefrom being quite popular.

After ascertaining all the facts that could be reached I learned that a stubborn prejudice was long entertained against the Illinois coke, and in favor of the Pennsylvania. This feeling could not have weighed much against the convenience of having their coke fresh, and the saving in being able to avoid the stocking of \$30,000 or \$40,000 of dead money in a year's coke ahead, since there never was a return to Connelville coke.

I examined with care the Beehive range of coking ovens at Grand Tower, thirty-two in number, the type of ovens used at that place. This is a plain, cheap kind of oven, and it would be safe economy if a similar coking range were erected at the Williamson County mines. Since examining the mines with reference to the question of coking, I am confirmed in the opinion previously formed at the



iron-works that the coke is a true iron-making article, and find myself borne out in the conclusions by the view taken of the coke as iron-making fuel by James Watson, an excellent fuel and iron expert, whose report has just reached me. Mr. Watson visited Grand Tower while the Illinois Coke was being used, and in a report made to A. B. Meeker and other Chicago iron men, for whom the examination was made in Southern Illinois, Missouri and Arkansas, he says, though somewhat incorrectly: "Illinois furnishes the fuel for the manufacture of iron in St. Louis, of Big Muddy Coal and Williamson County, Ills., Coke, for the ton of pig iron \$8." Sixty-five bushels of your coke will make a ton of pig-iron without any coal, and at ten cents per bushel would cost but \$6.50.

On examining your mining property, I find you to hold: First, 161 acres in fee; second, 120 acres on a royalty of 5 cents per ton; and thirdly, 1035 acres on an annual rental of \$1.00 per acre, or 1326 acres.

This body of land, with the exception of 41 acres, has, as the top and most accessible vein, fully a thickness of nine feet of superior coal, with all the coal veins underneath that are known in the State of Illinois in addition. Over 1250 acres of your land will, in the top vein, average 13,500 tons of prime coal per acre, of which say 12,000 may be put into market. The coal is so wonderfully accessible from the surface, and with so good a roof that 95 per cent. of the coal can be taken out.

I find from the proofs by drill holes, shaft and entries, that there is a total of 17,500,000 tons of coal in this single nine-foot vein, of which 15,500,000 tons can assuredly be removed, and by dropping the roof 1,000,000 additional tons can be procured.

The gross quantity of this available coal is subject to 25 per cent. deduction for waste or slack for all coal that will pass through a one-inch screen. On this amount of 3,750,000 tons of waste there is neither miners' rate or royalty ever paid, while in reality it is the best and richest of the vein, and by washing, every bushel of it can be made into prime coke.

The 11,600,000 tons remaining will be marketable lump coal, but all of it suitable for coke if required in that shape.

To extract the coal from the mine, there is now a slope and track. The vertical of the slope is 45 feet; the track from the slope ramifies throughout many thousands of feet of entries cut into the coal. On the head of the slope there is a most excellent Fulton Foundry, St. Louis, engine, with reversing winding gear, and boiler capacity to obtain, if needed, 50 to 60 horse power. There is also a 65-foot shaft that attacks the vein at a very favorable point for delivery on the railroad. Out of the slope and shaft it would be an easy effort to put out 750 tons of coal daily.

A switch from the Carbondale & Shawneetown Rail Road, 2,600 feet in length, connects with the main track.

The village of Cartersville, partly on the forty-one acres not calculated in the preceding estimate of gross yield of coal, contains two stores, a large boarding house, some twenty-five or thirty dwellings, and a district school with some forty pupils. While speaking of this forty-one acre tract, I will remark that the 9-foot vein is at its southern outcrop on this land.

This thick 9-foot vein is unknown by comparison with any of the classified veins in the Illinois Geological survey. In this survey No. 7 is the highest defined vein in that

arrangement. No. 7 is forty feet beneath the 9-foot vein, and has its outcrop in the neighborhood.

This 9-foot vein must be No. 8. It has no contemporary, nor is there any exposure of coal in the middle valley of the Mississippi that compares with it. The few fossils that accompany the vein go to establish it as dissimilar to any of the others. I am at a loss for facts justifying its being the No. 8 of the Western Pennsylvania Coal System; still the probability leans that way.

Borings at several points have been made from No. 7 down to No. 1, which is a vein lying between thick white and gray sand stone, and is nearly fifty feet below the lowest worked Muddy River vein, that 6-foot vein being Nos. 2 and 3 in contact. Every coal vein in Illinois is without doubt in position on your land with the added thick vein, that appears only as far as known on this elevated table near Cartersville. There are at least five good workable veins of coal on your land, besides the 9-foot full vein, of which the Muddy River veins constitute two.

I will now consider the question of the utilization of the slack or waste coal from the mines, of which there will be nearly 4,000,000 tons. Hitherto this slack has been sold to the Grand Tower Co., for their use in coke making. The blowing out of that furnace leaves the question fully open for consideration.

All coal can be rendered purer for coking by preliminary washing. Apparently pure coal will give off two to four per cent. of impurity; most of it may in some cases be simply carbonate of lime, yet there is as fully the liability that sulphate of lime is the extraneous material. Even if no sulphur pyrites is detected, washing reduces the ash contents. In the use of slack shoveled up from the mine

floor, fire-clay and portions of all the other impurities contained in the vein are in large quantities intermixed with the good coal, and must be removed by washing.

At your mines the quantity of water that can be made available is rather limited. Toward the washing of fifty tons of coal daily there would be a deficiency of sixteen tons of water. By saving the water from the jigs and re-using it, one ton of water will wash three tons of coal. The question has been under thought, whether it would not be policy to convey the coal to Crab Orchard Creek, six miles, where there is water constantly, and there construct coking works, or whether it would not be as good or better economy to have the coking at the mine, even if a portion of the water required were hauled in tank cars from the locomotive tank at Crab Orchard Creek, at a cost of twenty cents per ton for the water. The argument properly will be this: The water being but half the weight of the coal, will it be best to convey the lesser to the greater, or are there other advantages in being near the water? A location at the water, six miles away, must be attended with expense and a division of labor and superintendence. If located under the schute and screens at the mines, and near what water there is, there is the weight of argument in favor of the latter place. The slack or waste coal as it leaves the screens has descent enough to pass through the crushing rolls and jigs before reaching the level of the track. Elevation to a level high enough to drop the washed coal into small cars to run over the top of the coke ovens and into the charging hoppers will become necessary, unless the coal-way and schute be raised high enough to obviate elevation. All the considerations lead me to favor

coking at the mines, the principal one being the concentration of all operations under the eye of the superintendent of the mines.

To create a capacity to coke fifty tons of coal daily, there will be needed one twelve-horse engine, one pair of crushing rolls, and at least two jigs, an elevator to raise the washed coal from the jigs to the charging cars, and the track over the ovens with the small cars.

The Beehive oven, if not the most expeditious, certainly is the cheapest of the reliable kind. The total cost for the plant for a 1200 bushel coke production daily will be closely \$10,000. Two cars of coke a day will thus be made ready for shipment. This quantity of produced coke will fall far short of filling the demand for St. Louis. Still it is safe economy to commence on this scale. When expansion to 2400 bushels is demanded the machinery will be found amply strong enough for preparing one hundred tons of coal, or even two hundred tons, with but little added expense, except for stronger banding, and may be a pair of additional jigs. There is a surface configuration of the country draining into the locality for the retaining dam that is very favorable for the collection of the surface water. The dam will cause the water to approach within one hundred feet of the point where it will be used. For the accumulation of tailings, there is on the west side of the railroad embankment a deep valley that will afford room for many years.

## ESTIMATED VALUE OF PROPERTY.

120 acres in fee with	- - -	1,620,000 tons of coal.
120 acres royalty with	- - -	1,620,000 " "
1035 acres rental	- - -	13,972,500 " "

Or total tons - - - 17,212,500

At a valuation of 25 cents per ton,	-	\$4,303,125 00
Value of reserves of coal opened,	- -	35,000 00
Value of plant, engine, switch, schute, etc.,		16,000 00
Village property,	- - - - -	5,000 00

Prospective value, - - - \$4,359,125 00

From which we deduct:

Royalty of $3\frac{3}{4}$ cents per ton for run of mines, or of 5 cents per ton for lump coal, on leased lands, estimated quantity, or total yield, 15,595,500 tons, at $3\frac{3}{4}$ ,		584,831 25
One-fifth of same,	- - - - -	5)3,774,293 75

Establishes present value at - - - \$774,858 75

Assuming that the whole field will be exhausted in forty years, it will be seen that this value, \$774,858 75, at ten per cent. interest, can be fully sustained on the above basis.

Summary of property not included above:

Mine headings, etc.,	- - -	\$16,000 00
Surface of 120 acres,	- - -	3,000 00
Store house,	- - -	1,500 00

20,500 00

\$795,358 75

JOSEPH E. WARE, E. M.

*St. Louis, August 8, 1876.*

ST. LOUIS, Sept. 26, 1874.

*Carbondale Coal and Coke Co.:*

GENTLEMEN: Coke left for analysis, gives:

Water,	-	-	-	-	-	-	-	2.48	p. c.
Volatile matter,	-	-	-	-	-	-	-	2.42	"
Carbon, (fixed),	-	-	-	-	-	-	-	86.79	"
Ash, (pale brown),	-	-	-	-	-	-	-	8.31	"
								<u>100.00</u>	
Sulphur separately determined,	-	-						0.89	

This result shows the coke to be of unusually good quality. It is the highest in carbon and lowest in ash of any we have ever examined, and with a single exception the lowest in sulphur also.

Respectfully,

(Signed)

CHAUVENET BLAIR.

It must be considered that the above analysis was from unwashed coal, and had therefore more ash and sulphur.







